[redacted]

March 18, 1968

MEMO FOR COLONEL WORTHMAN

SUBJECT: Dr. Red Sheppard

Dr. Sheppard called in on Friday, March 15 and in your absence asked to talk with me.

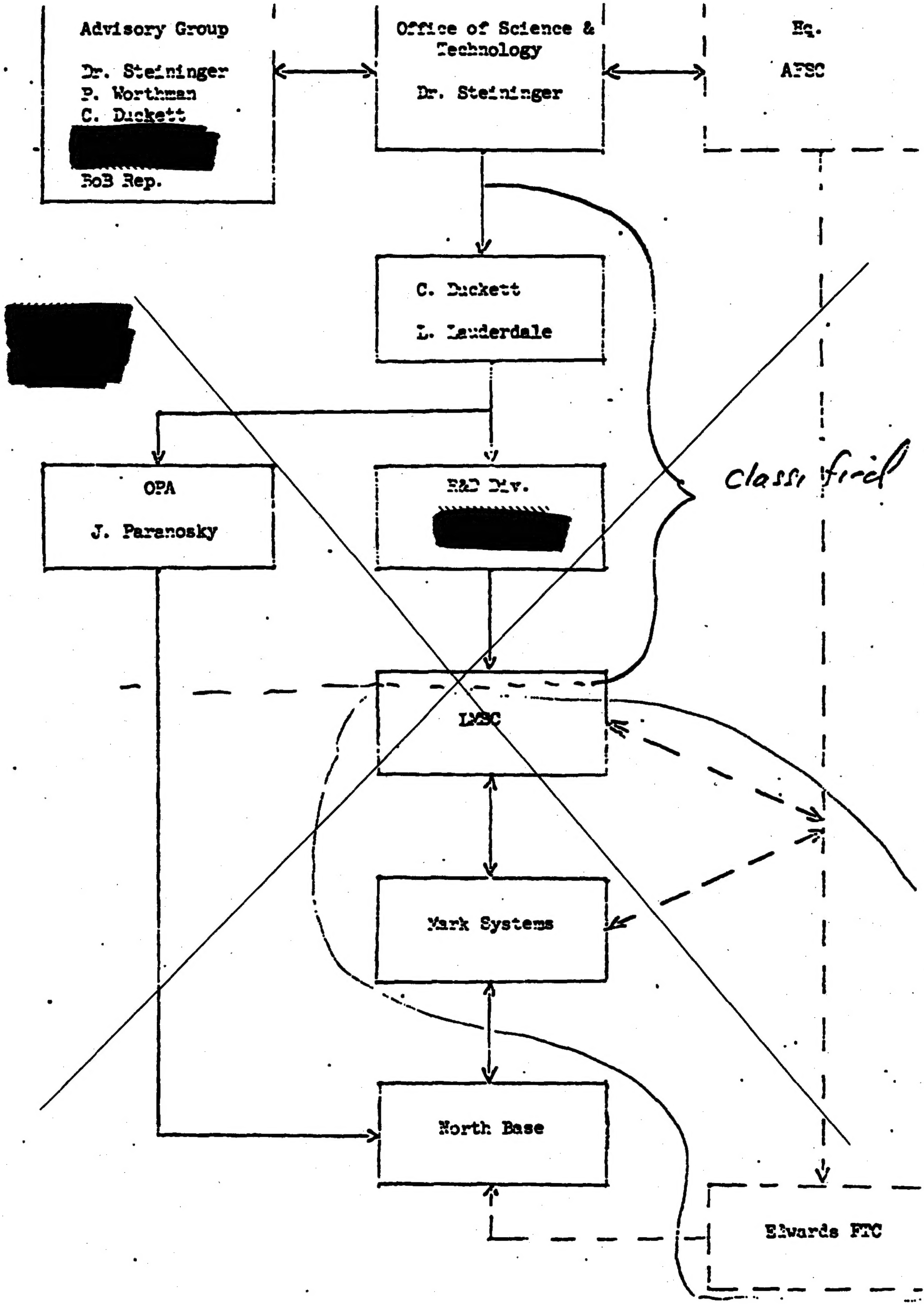
Purpose: To obtain your approval of his presenting to Dr. Steininger a copy of the attached -- which is the latest, he explains, on the project you encouraged them to undertake.

He related to me his earlier discussions with you and the series of briefings he had exercised. He ran through the current version for me.

Since I did not feel I could "sponsor" the submittal of the draft to Dr. Steininger -- and conversely -- since I did not feel I could or should discourage it -- I suggested he might "discuss" it but not leave a copy. He agreed. We reproduced the attached copy for you.

Dr. Sheppard will call you on Monday to relate happenings.

[redacted]


Advisory Group
Dr. Steininger
P. Worthman
C. Duckett
[redacted]
BoB Rep.
Office of Science & Technology
Dr. Steininger
Hq.
AFSC
C. Duckett
L. Lauderdale
[redacted]
OPA
J. Paranosky
R&D Div.
[redacted]
classified
LMSC
Mark Systems
North Base
Edwards FTC

PROGRAM RESPONSIBILITIES

PROGRAM CONTROL LEVEL

Office of Science and Technology (With the Assistance of the Advisory Group)

(1) Establishes general program objectives.

(2) Approves the augmentation to the project of any additional state, federal or inter-national cultural and natural resource activity.

(3) Coordinates inter-departmental policy relating to this project.

(4) Provides program results to other departments and agencies of the Government as appropriate.

(5) Insures assignment of authority and funds to the implementing Government activity.

Program Operations and Administration Level

CIA (R&D Div. and O.P.A.)

(1) Procures any necessary contractor services.

(2) Furnishes two aircraft flights per month with appropriate sensors.

(3) Coordinates action and activities to provide for any additional government furnished equipment, materiel, and other services essential to the operation.

(4) Reviews progress reports and monitors operations to the extent necessary to insure contractor performance.

(5) Provides guidance, direction and supervision to the contractor to assure compliance with program policies and procedures.

(6) Establishes guidelines for any special security as required.

(7) Administers all contractual activities.

(8) Payload activities will be handled within CIA through the R&D Div.

(9) Aircraft activities will be handled within CIA through O.P.A.

[redacted]

CONTRACTOR LEVEL

LMSC

(1) As Systems Contractor provide integration and coordination functions between contractors, state agencies and other organizations involved in the program.

(2) Perform interface functions between subcontractors and federal agencies in Washington, D.C.

(3) Perform advanced planning for future operational activities and develop other state earth resources applications.

(4) Provide those services and functions necessary to assure that security restrictions and other constraints are not violated.

(5) Relates its experience, knowledge and capability to the limitations and advantages of natural resources data collected by high altitude flight.

(6) Coordinate documentation and provide publication services for production of reports on overall effectiveness and results of the program.

(7) Assist in image interpretation and analysis.

Mark Systems

(1) Provide field operations, maintenance and services for loading and unloading sensors.

(2) Procure film, perform film handling, processing, annotation and other essential functions in preparing film for analysis.

(3) Participate in image interpretation and assist in analyses.

(4) Provide the spectral zonal photographic payload and its support.

[redacted]

(1) Act as advisor to the federal and state governments in technical and scientific matters pertaining to the total program.

(2) Serve as Chief Analyst and advisor to users in analyses of earth resources information.

(3) Establish requirements and act as principal technical advisor and coordinator in relating collected imagery to test site data and ground truth information.

(4) Assist in examining other possible and potential earth resource applications for the state.

(5) Critique results.

COPY

Suggested draft of:

(1) Memorandum for the Record

(2) Intra-office Activity Report

(3) Inter-office Operations Report

(4) Office Publication for release for public relations purposes if required.

(1) For over a hundred years man has used photography as a tool in his constant and continuing search to improve his conditions. Many governmental agencies such as the Department of Agriculture, the Department of Interior, and the Department of Commerce have used the information content of the photographic image to assist in the resolvement of complex departmental problems. Range land determinations, crop and acreage statistics, urban land use information and transportation networks and patterns are a few areas in which photography has been used advantageously.

(2) Through research and development, science and technology have evolved the means to efficiently and effectively acquire aerial photographic imagery in almost any detail and to almost any standard desired. The contributions of the scientific community have also been very significant in the development of techniques for the exploitation of the information content of aerial photographic imagery.

(3) Up until the last few years, however, not much action has been taken in the application and use of the technological advances in aerial photography and image analysis in conjunction with established ground truth data for the examination and assessment of natural and cultural resources. Recent applications of these techniques in efforts to correlate extensive ground truth investigations with medium altitude, large scale aerial photography have demonstrated the feasibility of using these techniques for identifying the dynamics of agriculture and forestry over a limited geographical area.

(4) Further scientific investigation and research is required in the correlation, analysis and examination of ground truth data obtained from established test sites with very high altitude, small scale, large area aerial photographic imagery of forestry and agriculture phenomena. This type of realistic scientific endeavor may provide the techniques and capabilities for the assessment of imagery and ground truth data of additional natural resources that could have significant social and economic implications.

(5) The collection, examination and analysis of resource information obtained from ground surveys and observations has long been practiced. The establishment in the state of California, for example, of ground truth test sites containing typical and representative types of trees for a given geographical forest area date back to 1914. Since that time this state has established many additional natural resource test sites that are pertinent to several State and Federal departments and agencies.

(6) With the introduction of aerial photographic imagery the general criteria for ground truth site selection, the number of sites being used, the functional relationship of these sites to the analysis process, the extent and quality of the ground truth data obtained from these sites, and the types of earth sciences represented have all been expanded and broadened. The development of interpretation and analysis techniques of relatively low altitude aerial photographic imagery in conjunction with the ground truth data obtained from established sites in the examination of forest and agriculture areas has had a significant impact on the accumulation of knowledge and the study of the dynamics of these two resources.

(7) The time has come to establish and confirm whether or not the technological and scientific advances which permit detailed examination of these resources can be accomplished practically and economically for economic purposes. It is vitally important to these scientific endeavors to examine

the utility and practicality of forestry and agriculture resource imagery obtained from very high altitude, small scale, large land mass coverage in conjunction with ground truth data collection techniques.

(8) One technological advancement of recent years has been the introduction and application of multi-band spectral photography. Through the use of multiple cameras — each with its own unique film and filter combination — it is practical to collect multiple images of the same ground using different film filter combinations. Tonal differences on the film will reveal, or provide substantial clues to the identity of the film-recorded objects. Multiband photography has increased the accuracy and meaningfulness of data collected by remote sensing. It has also increased the scope and complexity of film processing, data reduction, interpretation techniques and analysis. Multi-spectral photography is generally more valuable when analyzed in consideration for and recognition of the subtle tone changes. Attempts to obtain higher resolution at lower altitudes frequently deny the analyst the capability of recognizing these significant tone changes.

(9) One of the problems connected with the use of low altitude, large scale photography is the relatively high cost of processing and handling the large quantities of film involved. Photography from very high altitudes permits a significant increase in ground coverage for the same sweep when using a panoramic camera as compared to the coverage obtainable at lower altitudes using the same sensing equipment. Savings of major significance result from the large land mass coverage made possible with the current high resolution sensor systems flown at very high altitudes when related to the amount of man-hours and materials required in the photo processing, plotting, indexing, and other ground handling procedures of the same area coverage from low altitude.

(1) By offering to provide very high altitude, small scale photography of California ground truth test sites the Air Force contribution in furthering these scientific investigations and research is very significant. The U-2

aircraft offered for this purpose are based in California which permits full advantage being taken of on-going training flights. By integrating the ground truth test site photographic sorties with those training sorties being flown on a routine basis, the additional costs of acquiring the test site imagery is negligible.

(11) California has extensive industrial, agriculture and forestry resources. It has large water conservation programs and distribution systems, mountains, deserts and a long varied coastline. It has exceptionally good flying weather and a varied, active, existing ground truth test site program. The state is confronted with a typical cross section of natural and cultural research problems such as air and water pollution caused by expanding industries and a growing population.

(12) All of these factors, taken together, are of the utmost importance. Here is an opportunity to demonstrate not only the internal technical interfaces of a controlled scientific investigation of selective resources, but to develop the techniques and procedures, the knowledge and experience that could be applied to additional natural and cultural resources. This program will permit putting the scientific and technological know-how to work at the right time, in the right direction and against a specific resources problem.

PERSONNEL

LMSC

5 Personnel, Include Program Manager (Program Integration and Associate Interfaces)

1 Secretary (Indirect)

[redacted]

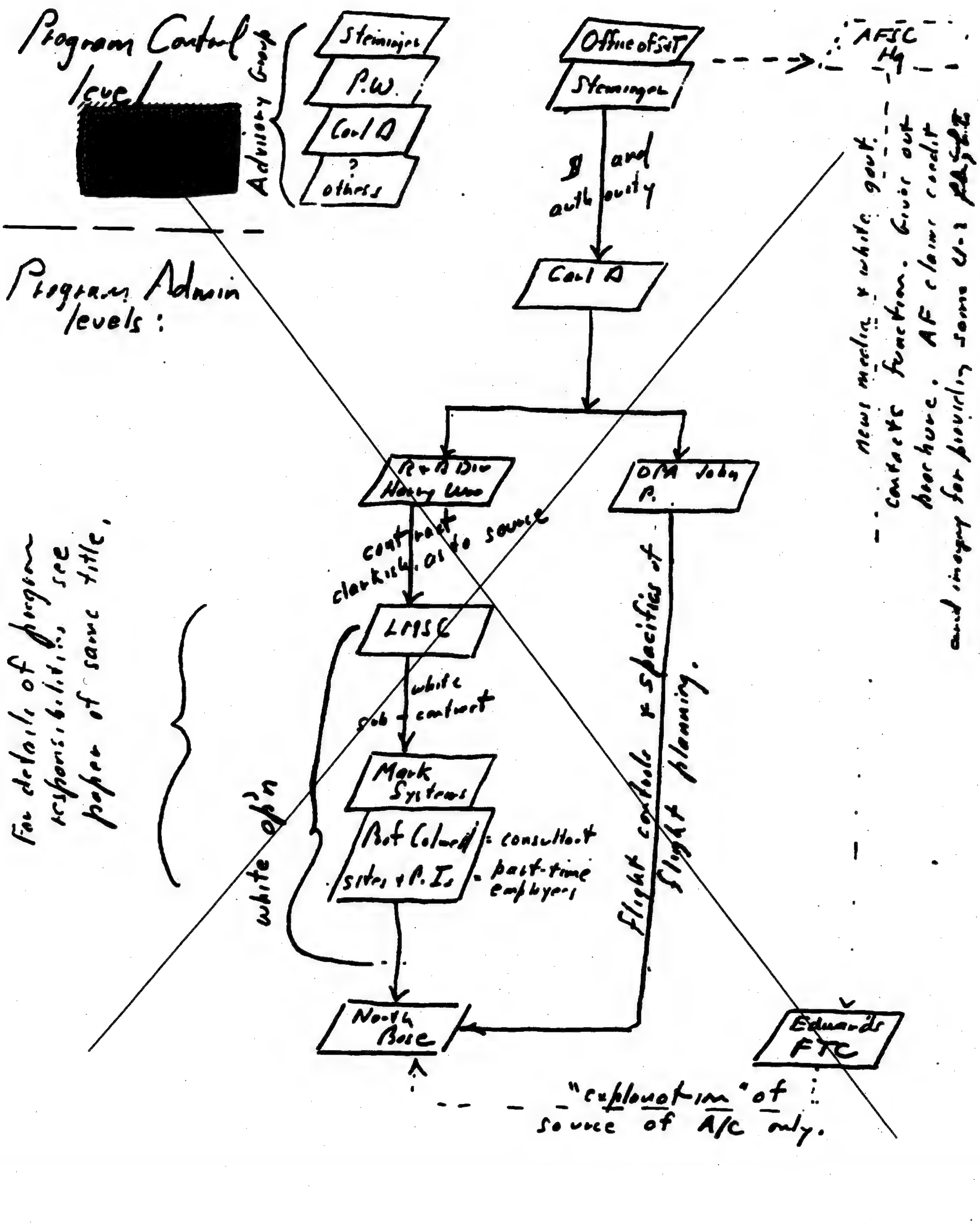
2 Full Time Equivalents

MARK SYSTEMS

3 Full Time Equivalents

Flight Support

2


Program Control level
[redacted]
Advisory Group
Steininger
P.W.
Carl D
? others
Office of S&T
Steininger
AFSC Hq
$ and authority
Carl D
Program Admin levels:
R&D Div Henry Lum
DPA John P.
contract clarification to source
LMSC
white sub-contract
Mark Systems
Prof Colwell = consultant
sites & P.I.s = part-time employees
white opn
flight controls & specifics of flight planning.
North Base
Edwards FTC
"explanation" of source of A/C only.
News media & white govt. contacts function. Gives out brochure. AF claims credit and images for providing some U-2 flights
For details of program responsibilities see paper of same title.

PROGRAM RESPONSIBILITIES

OFFICE OF SCIENCE & TECHNOLOGY

(Steininger)

- Direct the program for the U.S. Government, in accordance with objectives established by the Advisory Group

- Provide program results to other Departments of the Government, as appropriate

ADVISORY GROUP

Office of Science & Technology	Steininger
CIA	Carl Duckett & Tex Lauderdale
DoD	Paul Worthman (Secretariat)
Budget	?
NASA	Gene Simat & P. Krueger (only if necessary)

Note: Advisory Group meets at least once each month to establish program objectives and to review progress.

CIA

- Furnish two aircraft flights per month with appropriate sensors. These flights could be accomplished in conjunction with other requirements as only a portion of the film load will be required on each flight, for this particular program.

- Special security as required

[redacted]

- Payload activities will be handled within the CIA through ORD.

- Aircraft activities will be handled within the CIA through OPA

[redacted]

PROGRAM RESPONSIBILITIES

LMSC

(1) As Systems Contractor provide integration and coordination functions between contractors, state agencies and other organizations involved in the program.

(2) Perform interface functions between associate contractors and federal agencies in Washington, D.C.

(3) Perform advanced planning for future operational activities and develop other state earth resources applications.

(4) Provide those services and functions necessary to assure that security restrictions and other constraints are not violated.

(5) Relate experiences, knowledge and capabilities gained to limitations and capabilities of earth resources data and satellite operations.

(6) Coordinate documentation and provide publication services for production of reports on overall effectiveness and results of the program.

(7) Assist in image interpretation and analysis.

MARK SYSTEMS

(1) Provide field operations, maintenance and services for loading and unloading sensors.

(2) Procure film, perform film handling, processing, annotation and other essential functions in preparing film for analysis.

(3) Participate in image interpretation and assist in analyses.

(4) Provide the spectral zonal photographic payload and its support.

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(5) Critique results.